

## Comments on the papers by Dhruv Raina and Benjamin Zachariah

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## Comments on the Papers by Dhruv Raina and Benjamin Zachariah

*Dietmar Rothermund*

Introductory comment: Before commenting on the two papers I should like to mention two important contributions to the study of the social context of the sciences, since this is our subject here. Thomas Kuhn's work is generally known, but Ludwig Fleck's book *»The Genesis and Development of a Scientific Fact«* (Chicago 1979) has been very much neglected although Kuhn has acknowledged that he was influenced by it. The German original was published in 1935 at a most inopportune time. Fleck was an immunologist and serologist and the »fact« he uses as an example is the Wassermann blood test for syphilis. In the German subtitle he refers to styles of thought (Denkstile) and collectives of thought (Denkkollektive). In Kuhn's work these »styles« become paradigms and the »collectives« communities of scholars. Kuhn calls for a study of such communities, but does not do it himself, while Fleck's study of the team around Wassermann can be called a model of such a study. Fleck states that without the interaction in such a »collective« no such research is possible. Another exemplary study of this kind is David Hull's *»Science as a Process. An Evolutionary Account of the Social and Conceptual Development of Science«* (Chicago, 1988). Hull has done a detailed study of two competing »collectives« of scholars of systematic zoology. These rivals have struggled for the control of the major journal in their discipline. Hull is a philosopher and also a specialist in systematic zoology. He was also associated with the editing of the journal. So he belongs to the »internalists« and not to the »externalists« (social scientists who study the the external conditions influencing research but do not belong to the respective branch of science themselves). It seems that Hull has not read Fleck, but he would have certainly agreed with Fleck's arguments. Fleck had pointed out that both »thought« and »fact« are variables and had highlighted the process by which a »fact« is established. Hull also insisted on the analysis of processes and stressed that he had deliberately called his book *»Science as a Process«* and not *»Science as a Pattern«*.

In turning to the papers to be reviewed here we shall keep these ideas in mind. Of course, we also have to keep in mind that these papers are dealing with processes outside the sphere of »hegemonic« Western science whereas Fleck and Hull as

»internalists« within the sphere of Western science did not comment on non-Western science. But their approach can be extended beyond the field of Western science.

### Raina's paper on »Postcolonial Narratives of Modern Science«

Raina is concerned with science in a social context and opposes the standard tale about the transmission of Western science to the Non-West as part and parcel of »modernisation« in terms of the modernisation theory. He also is critical of the centre-periphery model. When looking for a new approach to the analysis of the transmission of science he then turns to Sushanta Goonatilake and his book *»Toward a Global Science. Mining Civilizational Knowledge«* (Bloomington 1998). But he does not approve of his approach which he calls »neo-positivist«. He deplores that Goonatilake simply tells the same old tale in reverse by highlighting elements of Non-Western science which have influenced Western science. He also accuses him of »picking up only those ideas that echo in the contemporary practice of the sciences and hence nourish the already existing paradigm of the sciences«. It seems that Raina is dealing rather harshly with Goonatilake. It must be admitted that Goonatilake had done a disservice to his work by giving it the subtitle »Mining Civilization Knowledge«. He is otherwise very sensitive to metaphors and even recommends them as tools of thought. But his own selection of »mining« as a metaphor is rather unfortunate. »Mining« refers to an activity of extracting raw materials from the ground in order to put them to some use, e.g. digging for coal as fuel for operating a steamengine. But Goonatilake is aware of the social context of science and quotes Fleck's work with approval, calling it »seminal«. Being obviously brought up as a Buddhist, he has a particular affinity to Buddhist thought which he portrays in many respects as a valid alternative to »Western« thought. It would have been interesting if he could have thrown some light on »collectives of thought« within the Buddhist Sangha which provided the critical mass for generating new thought. It is true that another unfortunate metaphor used by Goonatilake and criticised by Raina, that of »splicing in« such insights into the prevailing pattern of Western science, seems to suggest a rather mechanical insertion rather than a paradigm shift. But much of Goonatilake's text has more encouraging ideas to offer than »mining« and »splicing«.

Raina then turns to the critique of modernity, science and the nation state. He first turns to Gandhi and Goethe (the latter as portrayed by Jit Singh Uberoi). But he does not follow this up. It remains a tantalising hint in his rich paper. He devotes more attention to the quest for an alternative science as explored by Ashish Nandy

in the cases of the Indian physicist Jagadis Bose and the Indian mathematician Ramanujam. Again this remains a hint which is not followed up in detail. Finally Raina turns to the field in which he himself has made major contributions: the complex exchanges between Western and Indian science under colonial rule. He speaks of the »functioning trading zone where so called indigenous knowledge forms transacted with the practices of modern science«. Here Raina is perhaps closer to Goonatilake's intentions than he may care to admit.

In this context Raina also refers to the teaching of science in India. The paper by Zachariah on P.C. Ray is devoted to one of the eminent teachers of science in India, but unfortunately this particular aspect has not been discussed in detail in either of the papers.

Towards the end of his paper Raina turns once more to Jagadis Bose whom he had mentioned earlier in the context of Nandy's work. He raises the question why Bose's modern science was a success while his »Indian response« was a failure. This is a crucial question for Raina in his quest for an alternative science. Looking at this problem from the point of view of Fleck's study one may state that Bose did not have a »collective of thought« to interact with and thus his ideas remained »disconnected« as Fleck has said about Leonardo da Vinci's brilliant ideas which made no impact on the process of science.

In his final passage Raina argues for a »multicultural history of science which (...) suggests ... that universality is not given a priori but is constantly (...) evolving in time.« This is in keeping with the ideas of Fleck and Hull mentioned earlier and Raina would surely find them useful.

### Zachariah's paper on Prafulla Chandra Ray

Ray was a contemporary of Rabindranath Tagore and one of the few prominent Indian scientists of his time. This study of Ray as a public figure is very welcome, but it must be admitted that in the context of the discussion of the history of science one would have expected a bit more about Ray, the chemist. The treatment of his Hindu posture could have been cut down. It is, of course, to be seen in the light of current Indian debates. Zachariah quite rightly points out that Ray by giving the title »Hindu Chemistry« to his most wellknown book was not doing this for chauvinistic reasons. The French author who has asked him to write this book had written on Arab chemistry and asked Ray because of his linguistic equipment to write on Hindu chemistry. If Ray had called it »Indian Chemistry« and would have omitted Muslim contributions as he did not know Arabic or Persian, he could have been criticised for that.

Another point for which Ray has been criticised is that in his autobiography he has referred to being a Bengali rather than an Indian chemist. Another famous Bengali, Nirad Chaudhuri, called his autobiography that of »An Unknown Indian«. But the reader of this book would notice that it is quintessentially Bengali and would – by comparison – appreciate Ray's calling himself a Bengali in his autobiography. Zachariah has made good use of Ray's autobiography, but thinking in terms of Fleck's work mentioned earlier one would have hoped to hear something about Ray's notions of a scientific community with which he could interact – or the lack of it, if he should have missed it. Did he perhaps also feel »the great lack of any scientific intercourse« as the two British chemists Simonsen and MacMahon did when they arrived in India in 1910? (cf. A.Vasanth and D.K.Banerjee »The Indian Science Congress...« in: Deepak Kumar, ed. *Science and Empire*, New Delhi 1991, p. 182) These two chemists then founded the Indian Science Congress in 1914 and Ray obviously approved of their initiative because he was made the President of the second annual session in 1915. Ray's association with the chemistry section of the Science Congress would have been worth some attention. It would have also been interesting to know how he located himself in the field of chemistry in his time. Fleck writes about a »chemical craze« caused by the great success in the chemical analysis of physiological processes which tempted contemporary scientists to reduce the life sciences to chemistry. Ray was an organic chemist and could have been affected by this »craze«, or did »Hindu chemistry« serve as an antidote to this craze?

A further point which Zachariah mentions only in passing is Ray's activity of writing textbooks in Bengali and even providing a Bengali terminology for this subject. This should be a rich source for the study of his attempts at amalgamating »Hindu chemistry« with »Western chemistry«. Or did he resort to literal translation from the English original?

The paper is interesting more due to the unanswered questions which arise in the reader's mind than because of the ground actually covered. It is to be hoped that the author will enlarge the paper and take care of those questions.